

REVIEW

Capital Punishment and Anatomy: History and Ethics of an Ongoing Association

S. HILDEBRANDT*

*Division of Anatomical Sciences, Office of Medical Education,
University of Michigan Medical School, Ann Arbor, Michigan*

Anatomical science has used the bodies of the executed for dissection over many centuries. As anatomy has developed into a vehicle of not only scientific but also moral and ethical education, it is important to consider the source of human bodies for dissection and the manner of their acquisition. From the thirteenth to the early seventeenth century, the bodies of the executed were the only legal source of bodies for dissection. Starting in the late seventeenth century, the bodies of unclaimed persons were also made legally available. With the developing movement to abolish the death penalty in many countries around the world and with the renunciation of the use of the bodies of the executed by the British legal system in the nineteenth century, two different practices have developed in that there are Anatomy Departments who use the bodies of the executed for dissection or research and those who do not. The history of the use of bodies of the executed in German Anatomy Departments during the National Socialist regime is an example for the insidious slide from an ethical use of human bodies in dissection to an unethical one. There are cases of contemporary use of unclaimed or donated bodies of the executed, but they are rarely well documented. The intention of this review is to initiate an ethical discourse about the use of the bodies of the executed in contemporary anatomy. Clin. Anat. 21:5–14, 2008. © 2007 Wiley-Liss, Inc.

Key words: medical education; National Socialist anatomy; ethics in anatomy; history of anatomy; plastination

INTRODUCTION

Anatomists work with human bodies in research and teaching. As “medical ethics is about things done to the human body” (Barilan, 2005), it is imperative that anatomists consider the source of human bodies for dissection and the manner of their acquisition. This is especially important as the teaching of anatomy has evolved into a “vehicle for moral and ethical education” in the perception of students of anatomy (Dyer and Thorndike, 2000; Goddard, 2003).

Since the beginning of human anatomy, different sources of bodies for dissection have been documented. Among them are the bodies of the executed, bodies stolen from graveyards, unclaimed bodies from poorhouses, hospitals and prisons, the bodies of suicides or duelists, and the bodies of per-

sons murdered for the purpose of dissection (Ball, 1928; Singer, 1957; Jones, 2000; Sappol, 2002). Contemporary anatomists mostly use donated bodies; in many countries, the use of unclaimed bodies is also legal. Anatomical programs frequently opt for the use of donated bodies exclusively because of ethical considerations including the voluntary deci-

*Correspondence to: Dr. Sabine Hildebrandt, Division of Anatomical Sciences, Office of Medical Education, University of Michigan Medical School, 3767 Medical Science Building II, Catherine Street, Ann Arbor, MI 48109-0608, USA.
E-mail: shilde@umich.edu

Received 7 December 2006; Revised 18 October 2007; Accepted 28 October 2007

Published online 3 December 2007 in Wiley InterScience (www.interscience.wiley.com). DOI 10.1002/ca.20571

TABLE 1. Legislation Concerning the Use of the Bodies of the Executed for Anatomical Purposes

Year	Legislation
1238	Italy (Salerno), Frederick II: Permission granted for one human dissection every 5 years, most likely bodies of the executed (Persaud, 1984), first known authorization of dissection (Nemec, 1968)
1299	Papal bull of Boniface the VIII: "Detestande feritatis": Anatomical Departments need to apply for a papal dispensation to use the bodies of the executed (Schmugge, 1989; Pauser, 1998; Jones, 2000)
1387	Italy (Florence): 3 bodies per year (Ball, 1928)
1482	Papal bull of Sixtus IV: Grants the University of Tübingen the use of the bodies of the executed ("cadavera...malefactorum") for anatomical purposes (Schmugge, 1989; Drews, 1992)
1506	Scotland, James IV: One body of the executed annually for the Edinburgh Guild of Surgeons and Barbers (Pauser, 1998)
1539	Italy (Padua), statute of the city: Bodies of the executed given to Andreas Vesalius (Pauser, 1998)
1540	England, Henry VIII: "Four hanged felons" to the Barber-Surgeons of London annually (Sappol, 2002)
1565	England, Elizabeth I: Permission for the dissection of executed criminals (Nemec, 1968; Duffin, 1999)
1600	Czechia (Prague): Public dissection of the body of an executed person (Nemec, 1968)
1647	Massachusetts: Provision for anatomists to use bodies of the executed (Sappol, 2002)
1676	Germany (Giessen): Letter by Landgraf Ludwig VI of Hesse-Darmstadt to allow the use of bodies of the executed for anatomical dissection at the University of Giessen (Enke, 2005)
1699	Germany (Jena): All "cadavera punitorum" i.e. bodies of the executed and suicides to be delivered to the University of Halle for anatomical purposes (Viebig, 2002)
1701	Germany (Mecklenburg): The body of the executed Joachim Mathewesen to be delivered to the University of Rostock for anatomical purposes (Schuhmacher and Wischhusen, 1970)
1726	England, George II: All bodies of the executed to be given to anatomists (Ball, 1928)
1752	Great Britain: Act of Parliament for "better Preventing the horrid Crime of Murder", so-called "Murder-Act" (Richardson, 1987)
1789	USA (New York): Use of bodies of the executed for dissection (Sappol, 2002)
1870	USA (Vermont): Bodies of the executed assigned for anatomical dissection (Sappol, 2002)
1933	Germany (Prussia): Delivery of the unclaimed bodies of the executed to specified Departments of Anatomy (Viebig, 2002)
1939	Germany: Directive given by the Ministry of Education ("Runderlass W A 55 des Reichserziehungsministerium") to deliver all unclaimed bodies of the executed to nearby Departments of Anatomy (Mühlberger, 1998)

sion of the donor and his or her family and the dignity of the human body (Davidson, 1995; Jones, 2000; Becker, 2002; Bundesärztekammer, 2003). Depending on local legislation, both groups, the donated and the unclaimed, can include the bodies of the executed.

In this study, the history and ethics of the association between capital punishment and anatomy are examined. It is the intention of this review to promote an ethical discourse about the use of the bodies of the executed in contemporary anatomy.

HISTORY OF THE USE OF BODIES OF THE EXECUTED IN ANATOMY

The use of bodies of the executed for human dissection is as old as the exploration of human anatomy itself (Pauser, 1998). From the first human dissections in Alexandria 300 BC (von Staden, 1989) until the late seventeenth century, the executed together with bodies acquired by grave robbing represented the only sources of cadavers for anatomists (Ball, 1928; Hunter, 1931; Sappol, 2002). With the

rise of anatomy as a science in the fifteenth and sixteenth century, the demand for human bodies for dissection increased and official complaints by anatomists about the insufficient body supply led to legislation making bodies of the executed legally available for anatomical dissection. Bodies of the executed then became a widely used source for dissection in Europe, the USA, and Australia (MacDonald, 2006), but not in New Zealand (Jones, 2006). The development of legislation in Europe and the Americas from the thirteenth to the twentieth century is shown in Table 1.

Academic anatomical dissections were frequently open to the public and associated with great dishonor for the dissected in the mind of the general population, as the dissection was felt to "violate [d] both its [the corpses] personhood and its social identity by rendering it unrecognizable and unsuited it for a conventional funeral" (Park, 2006). In the late seventeenth and throughout the eighteenth century, legislators took advantage of this public perception by using the threat of dissection as a deterrent measure to committing serious crimes. Anatomical dis-

TABLE 2. Legislation Concerning the Use of the Executed and/or Unclaimed Bodies

Year	Legislation
1694	Scotland (Edinburgh): Town council agrees to hand over to Alexander Monteath, member of the surgeons guild, "bodies that dye in the correction house" and those "of fundlings that dye upon the breast" for a time span of 13 years (Wolf-Heidegger and Cetto, 1967)
1698	Italy (Bologna): Letter by Pope Innocence XII to deliver unclaimed bodies from hospitals to the "Scuola di Anatomia" (Wolf-Heidegger and Cetto, 1967)
1730	Germany (Halle): Delivery of bodies of the executed and of the poor or imprisoned to the Department of Anatomy at Halle University (Viebig, 2002)
1742	Austria: Delivery of the bodies of the executed and of the poor to the Department of Anatomy at the University of Vienna (Angetter, 1999)
1762	Germany (Tübingen): Ducal ordinance to deliver the bodies of the executed, paupers, and unclaimed bodies to the Anatomical Department in Tuebingen (Drews, 1992)
1762	Germany (Bützow, Mecklenburg): To deliver the bodies of the executed, suicides, and unclaimed bodies to anatomists (Schuhmacher and Wischhusen, 1970)
1781	Germany (Giessen): To deliver the bodies of duelists, suicides, drowned, prostitutes, and indigent poor and drunkards to anatomists (Enke, 2005)
1781, 1821, and 1842	Germany (Prussia): All bodies of the poor, from psychiatric hospitals, suicides and prisoners (including the executed) without exception to be delivered to Anatomical Departments; modifications concerning mitigating circumstances or consent of relatives in 1889, 1927 (Viebig, 2002)
1791 and 1866	Germany (Mecklenburg): Delivery of the bodies of the executed, suicides, and indigent poor as well as unclaimed bodies to the anatomist Prof. Josephi in Rostock (Schuhmacher and Wischhusen, 1970)
1789–1947	USA: US congress and individual states of the US give bodies of the indigent poor to Medical Schools (Sappol, 2002)
1798	France: Unclaimed bodies from prisons, hospitals, and poorhouses (Duffin, 1999; Gere, 2005)
1931	Austria: Delivery of unclaimed bodies from hospitals, private homes, and mental institutions to Anatomical Departments (Mühlberger, 1998)
1952	German Democratic Republic: unclaimed bodies and bodies donated by the deceased or family (Schuhmacher and Wischhusen, 1970)

section became part of the capital punishment (Drews, 1992; Sappol, 2002), for example with the so-called "Murder Act" of 1752 in Britain (Richardson, 1987). Certain crimes became "punishable by dissection" and the anatomy of this time presented itself as an "ill-defined (...) mixture of punitive and medical purposes" (Sappol, 2002, p 102). The addition of anatomical dissection as punishment was considered more frightening and ignoble by many offenders and their families than the execution itself (Hunter, 1931).

This attitude toward dissection started to change in the eighteenth century with an increasing public interest in the sciences. Anatomy flourished in Europe and the body supply from executions did not satisfy the increasing needs of medical schools, especially as execution rates had started to drop in some countries (Stukenbrock, 2003). Consequently, governments on the European continent passed legislation allowing the use of the unclaimed bodies of "paupers," inmates of prisons and psychiatric and charitable hospitals for dissection (Pauser, 1998). These regulations frequently continued to include the use of the bodies of the executed (Table 2). By the end of the eighteenth century, the availability of unclaimed bodies alleviated the shortage of the body supply for anatomical dissection on the European continent (Stukenbrock, 2003).

The situation was different in Great Britain where legislation concerning the use of unclaimed bodies was not yet introduced by the beginning of the nineteenth century. Grave robbing had become a com-

mon practice and even murder for dissection occurred, eliciting public and sometimes violent outcries against anatomists (Ball, 1928; Hunter, 1931; Richardson, 1987). To resolve this situation, the British government passed the Warburton Anatomy Act in 1832, which provided the use of the poor and unclaimed for anatomical dissection, but excluded the use of the bodies of the executed. At the same time, the Anatomy Act allowed for body donations (Ball, 1928; Richardson, 1987). Other countries belonging to the British Commonwealth followed with similar legislation (Jones and Fennell, 1991; Persaud, 1997; Gopichand, 2002; Walia, 2003; Canadian Legal Information Institute, 2006).

Two further developments influenced the use of bodies for dissection in the nineteenth and twentieth centuries: the creation of body donation programs and the abolition of capital punishment in many countries. Both developments resulted from considerations of individual human rights and dignity. The body supply by donation, usually regulated by Anatomical Gift Acts (e.g., Uniform Anatomical Gift Act, 1987), became sufficient for many anatomical programs worldwide by the middle and late twentieth century. The abolitionist movement grew steadily throughout the nineteenth century, but suffered a setback with the emergence of totalitarian systems in Hitler's Germany and the Soviet Union under Stalin during the first half of the twentieth century (Schabas, 1993; Amnesty International, 2006; DPIC, 2006).

TABLE 3. Numbers of Death Sentences and Executions [in brackets] During the First Half of the 20th Century (Wagner, 1974; Messerschmidt and Wüllner, 1987)

	1907–1932	1914–1918	1933–1945
Germany	1,547 [337]	Civilian courts: 141 [94] Military courts: 150 [48]	Civilian courts: >16,000 [~14,400] Military courts: >16,000 [~14,400] [1,184 or 1,377 ^a]
Vienna alone	–	–	–
Great Britain	–	3,080 [346]	–
France	–	2,000 [330–700]	–
Italy	–	–	156 [88]
US/France/Great Britain	–	–	[300 ^b]

^a1938 to 1945 according to Malina and Spann (1999).

^bFrom 1939 to 1945.

FROM USE TO ABUSE: PRACTICES OF NATIONAL SOCIALIST ANATOMISTS

A special situation arose in Germany and its occupied territories during the National Socialist regime from 1933 to 1945. During this time, civilian and military German courts handed down at least 32,600, but possibly more than 40,000 verdicts of capital punishment; about 90% of the individuals were executed (Wagner, 1974; Messerschmidt and Wüllner, 1987). These numbers far exceeded those from previous time periods in Germany or other western countries in the twentieth century. For example, Italy executed 88 individuals during the same time period, and the US, France, and Britain together executed 300 individuals between 1939 and 1945 (Table 3).

The greatest increase in the numbers of death verdicts and executions occurred during the war years from 1939 to 1945. Punishable by death were not only serious crimes like murder but also "high treason," which could mean anything from active political opposition to listening to enemy broadcasts (Angetter, 1998). The German Ministry of Education had emphasized with a decree from 1939 that all bodies of the executed should be delivered to the closest Anatomical Institute for scientific use (Mühlberger, 1998).

Apart from the bodies from executions following legal proceedings in civilian and military courts, anatomical departments also received bodies from concentration camps, prisons, and psychiatric institutions (Grundmann and Aumüller, 1996; Viebig, 2002; Redies et al., 2005). Many of the victims had been killed by direct acts of violence (e.g., beatings or poisoning) or more indirect measures (e.g., starvation and neglect). These deaths were part of extermination programs like the "Aktion T4" euthanasia program (Klee, 1985; Lifton, 1986).

Departments of Anatomy in Germany took advantage of this inflow of "material," independent of whether the anatomists themselves were committed National Socialists or not. Research based on material from the bodies of the executed is mentioned in publications from many anatomists of this period, testifying to their knowledge of the source of the bodies (e.g., Ferner, 1940; Sussmann, 1940; Aumüller and Grundmann, 2002). The bodies were also needed for increased teaching requirements

during the war years (Grundmann and Aumüller, 1996). Reflecting on the use of the bodies of the executed by German Anatomists during the National Socialist period, Hermann Stieve, chairman of the Department of Anatomy at Humboldt University, Berlin, remarked: "Es gibt keinen unbelasteten Anatomen in Deutschland" ("There are no nonincriminated anatomists in Germany," translation by author; quoted after Viebig, 2002).

In Jena, 200 of 2,224 bodies received from 1933 to 1945 were bodies of the executed (Redies et al., 2005). The Anatomy Department of the University of Tübingen, whose Chairman Robert Wetzel was an active National Socialist and SS (*Sturm-Staffel*, a Nazi elite troupe) spy (Wetzel, 1940; Mörike, 1988; Klee, 2003), used 1 to 2 bodies of the executed per year, but received 87 bodies between 1941 to 1944, mainly from the execution chambers in Stuttgart (Schönhagen, 1992). Nearly 3,000 people, mostly political prisoners, were executed in the Berlin chambers of execution at Plötzensee from 1939 to 1945. Most of these bodies were delivered to the Department of Anatomy at Humboldt University (Schagen, 2005).

After Austria's annexation in 1938, Eduard Pernkopf, Head of the Anatomy Department and Dean of the Medical School in Vienna, an active National Socialist party member (Weissmann, 1985), suggested that the bodies of executed persons from Poland should be transported to Austria. This became unnecessary as the numbers of executions increased in Vienna (Mühlberger, 1998). From 1938 to 1945, the Anatomical Institute received 1,377 bodies of executed persons in addition to 3,964 unclaimed or donated bodies during the same time period (Malina and Spann, 1999; Angetter, 2000). Arrangements in terms of the timing of the executions were made between the Anatomical Institute and the executioner to facilitate transfer and storage of bodies (Mühlberger, 1998). The bodies were used for dissection courses and other teaching purposes as well as for the creation of some of the plates in Pernkopf's "Atlas of Topographical Anatomy" (Williams, 1988; Hildebrandt, 2006).

Another leading German anatomist who collaborated closely with the execution agencies was Hermann Stieve of Berlin. His field of research was the influence of external factors on the reproductive system. During the 1920s and 30s, after preliminary

research on animals, he started to study the effect of acute and chronic nervous anxiety on reproductive human organs excised from executed males and from female accident and suicide victims. The bodies of executed women were extremely rare until the increase of death verdicts and executions under the National Socialist regime, providing Stieve with a large number of female specimens. These women had suffered great acute and chronic trauma through imprisonment and after the announcement of their actual date of execution (Aly, 1987; Schagen, 2005). In addition, his studies also included women's physiological reaction to rape before execution (Stieve, 1952; Seidelman, 1999). Stieve was informed about every scheduled execution 2–3 days in advance and had an anatomy technician attend the executions and harvest organs immediately.

The anatomist Hermann Voss became Dean of the newly created University of Posen (now known as Poznan) in the German-occupied Poland in 1941 (Klee, 2003). Voss was "enthusiastic" about the great number of executions in Posen (Aly, 1994) as they provided enough bodies not only for his institute but also for the Anatomical Institutes in Breslau and Königsberg (Aumüller and Grundmann, 2002; Klee, 2003). He praised the "beauty" of the dissections due to the freshness of the material. At the same time the bodies, mostly of Polish citizens, showed clear indications of the manner of execution, usually hanging and torture (Aly, 1987, 1994). Together with dissector Gustav von Hirschheydt, Voss sold "Polish skeletons," "Jewish skulls," and plaster casts (death masks) of "Jewish heads" that secured them an additional source of income. Many of these specimens were sent to Josef Wastl, curator of the Department of Anthropology at the Museum of Natural History, Vienna (Klee, 2001; Aly, 2003). Voss' assistant Robert Herrlinger wrote his dissertation on experiments on "material" sometimes examined directly in the execution chambers (Klee, 2003). Voss, Herrlinger, and Stieve continued in their careers as highly respected scientists after 1945 (Heiss, 1952; Klee, 2003).

Johann Paul Kremer, a SS-member since 1934, was the only Professor of Anatomy working as a physician in the Auschwitz concentration camp. He spent 3 months at Auschwitz in 1942, detailing the events of each day in a diary. These included help with the selection of victims at the ramps, attendance at executions, and collection of data for his research on the effects of starvation on the human body. After the war, he was imprisoned in Poland for 10 years and in 1960, in Germany, he was convicted of assistance to murder in two cases (Landgericht Münster, 1960; Lifton, 1986).

August Hirt, SS-member, became Director of the Anatomy Department at the University of Strassburg in 1941. In 1942, he suggested the creation of a collection of Jewish skeletons and had the victims transported from Auschwitz to the nearby concentration camp in Natzweiler. Hirt provided the cyanide salts for the executions to the commander of the camp. The bodies were then processed in Strassburg (Mitscherlich and Mielke, 1960; Lachman, 1977; Spitz, 2005). Hirt committed suicide on the second of June, 1945.

Wetzel, Pernkopf, Stieve, Voss, Herrlinger, and other German and Austrian anatomists did not execute prisoners personally, whereas Kremer and Hirt took their involvement a step further by becoming executioners themselves. All of these anatomists knew about the circumstances of the executions including time and manner of death. In addition, they frequently collected medical histories for research purposes from prison wardens and coordinated timing of executions with their research needs (e.g., Schagen, 2005). They clearly profited professionally from the executions perpetrated by a criminal regime and some of their work was used worldwide after the war (e.g., Stieve, 1952; Gerhard and Frommhold, 1988; Hildebrandt, 2006). They had legal access to the bodies of the executed before the start of the National Socialist regime in 1933 and continued their procedures under the auspices of a totalitarian government that provided them with heretofore unknown opportunities in terms of quantity and "quality" of "material." This practice resulted in an insidious slide from opportunism to active criminal involvement in a political system of injustice.

CONTEMPORARY ANATOMY

A Case From Texas

One of the few well-documented cases of using the bodies of the executed is the male specimen from Texas used for the National Library of Medicine's Visible Human Project (NLM NIH, 2007). During the 1980s, the National Library of Medicine decided to create a Visible Human Data Set as part of a new biomedical library. The goal of the approach was to obtain digital images of computer-assisted tomography (CAT) scans, magnetic resonance imaging (MRI) scans, and cryosections of a "representative, carefully selected and prepared male and female cadaver" (Ackerman et al., 1995). A contract was awarded to the University of Colorado at Denver in 1991. The search for appropriate cadavers proved to be the most time-consuming part at the start of the project (Spitzer and Whitlock, 1998), as the researchers had to wait for "the right combination of willing donor, prompt notification of death, desired state of whole-body anatomy, and rapid decision-making capability" (Spitzer and Scherzinger, 2006). These conditions were met by the donor for the male body, Joseph Paul Jernigan, a 38-year-old convicted murderer. He was executed by court-ordered lethal injection at 12:31 AM on August 5, 1993 and his body was received by anatomists 90 min later (Spitzer et al., 1996). Mr. Jernigan was one of several Texas death row inmates who had willed their bodies to science after prompting by a prison chaplain to contribute to society by this gesture (Dowling and Tsiaras, 1997; Hopper, 2002). The ethical feasibility of the project was discussed by anatomists, ethicists, and the Texan authorities, and the investigators were given permission to proceed (Hopper, 2002). It was intended to keep the identity of the

Visible Male anonymous, but reporters were able to identify him after the time, place, and manner of his death were published. Mr. Jernigan's motivation for the bequest of his body to science has been reported variously as either wanting to save his family the cost of the burial, to bring something good to society after a life of crime, or to become famous (Dowling and Tsiaras, 1997; Hopper, 2002).

A Case From the People's Republic of China

The Chinese medical system generally has no legal or ethical restrictions in using the bodies of the executed for medical purposes. The use of the bodies of the executed is regulated by laws like the one ratified in 1984, Article 3 of China's Provisional Regulations on the Use of Executed Prisoners' Corpses or Organs, stating that a corpse may be used for medical purposes if nobody claims the body or the family refuses to bury it; the prisoner voluntarily donates the body for use by medical facilities; or the inmate's family consents to its use after death (Parmley, 2001; Mohseni, 2006). Executions are frequent in contemporary China. In 2004, about 6,000 people were sentenced to death and 3,400 executed (Amnesty International, 2005). Verdicts of capital punishment can be handed down for violent and nonviolent crimes like corruption and so-called counterrevolutionary activities (Wu, 1992, 1996, 1998).

The use of organs harvested from the bodies of the executed for organ transplantations is well documented (e.g.: Wu, 1996, 1998; Parmly, 2001; Guoqi, 2002; Boseley, 2006). On the other hand, documentation for the use of these bodies for anatomical purposes is scarce. One rare report comes from Harry Wu, a former camp prisoner, who watched medical students exhume bodies from a prison cemetery (Hours, 2005).

Since 2004, evidence has been accumulating that bodies of the executed have been used for the preparation of plastinated human specimens in China (e.g., Peuker and Schulz, 2004; Röbel and Wassermann, 2004; Barboza, 2006). In 1999, Gunther von Hagens, a German plastinator, moved a major part of his operations from Heidelberg, Germany, to Dalian, China (Barboza, 2006). Although von Hagens claims that only donated bodies are being used as whole-body plastinates in his exhibits, he also mentions the use of unclaimed bodies for other purposes. He states that he adheres strictly to "the tradition in a given country" and that his body acquisitions always follow the law of the country of origin (von Hagens, 2003). An audit of his Dalian Institute in 2003 revealed the presence of only one documented Chinese body donor, whereas the storage area contained 647 intact bodies, 3,909 body parts, and 182 fetuses, embryos, and neonates. Seven bodies showed injuries compatible with an execution, i.e., bullet wounds to the head (Peuker and Schulz, 2004). Von Hagens, who held his co-worker Sui Hongjin responsible for the acquisition of these bodies, had them buried immediately.

After his severance from von Hagens, Sui Hongjin established his own plastination laboratory in affiliation with Dalian Medical University (Peuker and Schulz, 2004). He made whole-body plastinates of unclaimed Chinese bodies available for a fee to Premier Exhibitions, the organizers of "Bodies: The Exhibit," one of the many new traveling shows of human plastinated specimens (Mohseni, 2006; Ulaby, 2006). Arnie Geller, president of Premier Exhibitions, said of the bodies: "they are all found by police and [...] nobody claimed them before they were donated to the Medical School" (Hours, 2005). The organizers also pointed out that the bodies were legally obtained by Dalian Medical School, and that they had seen documentation for that, but no signed consent, and had not been able to retain copies of these papers (Graham and Duryea, 2005; Jacobs, 2005; Weingarten, 2005). In addition, the official website of the exhibit explains that the bodies are part of a worldwide contingent of "donated or unidentified" bodies (Premier Exhibitions, 2006). The bodies in this exhibit are young and show distinctly Asian features, as do many specimens in about ten similar traveling exhibits that mostly originate from new plastination facilities in China (Working, 2005; Our Body, 2006). Over the last 10 years, China has developed an active trade with plastinated human specimens (Barboza, 2006), which, according to Sui Hongjin, is due to the multitude of skilled anatomists in this country (Working, 2005), but is more likely due to the availability of unclaimed bodies, which may include the bodies of the executed. In July 2006, the Chinese government, concerned about the growing trade with bodies and body parts, issued new regulations that outlawed the purchase or sale of human bodies and restricted the import and export of human specimens, unless used for research (Barboza, 2006).

ETHICAL CONSIDERATIONS CONCERNING THE USE OF THE BODIES OF THE EXECUTED IN ANATOMY

The historical and contemporary examples illustrate how the bodies of the executed were used in anatomy and the inherent potential for a slide from use to abuse. They also illustrate the need to question and discuss established procedures in terms of their accordance with current ethical concepts. An important ethical question is: Is it ethical for modern Departments of Anatomy with body donation programs to use the bodies of the executed at all?

Why do anatomists use the bodies of the executed for dissection? While at first these bodies were the only legal source, they later became mainly an additional source among others. Today they are used in those countries where the bodies of the executed are still legally available or donated bodies are scarce (e.g., Nnodim, 1996). Throughout history, anatomists have "valued" the bodies of the executed highly, because they were relatively young and healthy. The time of death was known; hence, information could be obtained before and after death; the

“material” was fresh and timing of the research done on postmortem specimens became controllable (Stukenbrock, 2001). During the National Socialist period, the sheer quantity of the bodies of the executed offered new opportunities for research and medical education.

The history of the National Socialist anatomists shows “how quickly the dignity of the dead can be violated in anatomical institutes in a political system that disregards human rights” (Redies et al., 2005). The truly disturbing fact is that these anatomists, proud of their humanistic traditions, did not seem to feel this slide or ask any questions about the circumstances surrounding the executions. What they did was legal in Germany at the time, and by their own professional standards they felt their work was justified. After the war, Hermann Stieve explained his attitude: “The anatomist (...) only tries to retrieve results from those incidents [executions] that belong to the saddest experiences known in the history of mankind. In no way do I need to be ashamed of the fact that I was able to elucidate new data from the bodies of the executed, facts that were unknown before and are now recognized by the whole world” (translation by author, quoted after Schagen, 2005). The downfall of the National Socialist anatomists was that they accepted the power and opportunities a legal system gave them without questioning the system or their own actions.

The case from the People’s Republic of China poses problems as there is only vague information available concerning bodies used for anatomical dissection (e.g., Zhang et al., 2003). Capital punishment and the use of unclaimed bodies are legal options in Chinese anatomy but not in all parts of the world. Thus, the situation becomes complicated when Chinese bodies are presented as objects of international exhibits. The possible use of the bodies of executed Chinese citizens outside their country of origin continues a tragic tradition of economical and racial discrimination. Historically, economical and racial discrimination in anatomy included gypsies in Europe in the eighteenth century (Enke, 2005), Tasmanian aboriginals and African Americans in the nineteenth century (Drews, 1992; Blakeley and Harrington, 1997; Macdonald, 2006; Halperin, 2007), and Jews and other minorities in National Socialist Germany. In the modern version of this discrimination, bodies of “impoverished or convicted Asians” become “commodified [...] in contemporary medical culture” (Stern, 2003). This is an ethically unsatisfactory situation that needs to be discussed globally.

While capital punishment as well as the use of unclaimed bodies are legal in many US states, the Visible Human Project stipulated the use of bodies from volunteers who had given their informed consent, thus clearly indicating consideration of the individual human rights of the donors. Given the ongoing international debate concerning the death penalty, why was the body of an executed man chosen? Whereas it was an opportune choice it cannot have been the only possible one, as the Visible Female was a 59-year-old woman who died of leukemia (Wade, 2007) and the Korean Visible Human

project used the body of a 33-year-old man who died of leukemia (Park et al., 2006). In addition, it has to be discussed if “informed consent” is possible without coercion on death row, i.e., if anybody can consent to the bequest of their body facing capital punishment and the predestined timing of one’s death? As Parmly pointed out that condemned prisoners and their families may not be able to make free and full-voluntary decisions on organ donations because of the very nature of incarceration (Parmly, 2001), the same considerations hold true for voluntary body donations by prisoners. In times when physicians around the world refuse to be participants in legally authorized executions (WMA, 2003; AMA, 2005), should not anatomists come to a similar decision in their field?

CONCLUSION

The association between capital punishment and anatomy has to be evaluated in its specific historical context. Laws and ethical concepts have changed in many countries over the last three centuries, and what was legal and ethical in the past is not necessarily legal and ethical today. Recently published examples of new ethical guidelines are the recommendations by the German General Medical Council and the British Department for Culture that provide ethical considerations and practical advice on the treatment of human specimens of questionable ethical provenance (Bundesärztekammer, 2003; DCMS, 2005; see also Barilan, 2005, 2006). Anatomical Departments around the world have to formulate official ethical standards on the treatment of human remains; standards that are suitable for each individual country and that involve among others the exact documentation of sources of bodies for dissection. The time has come to develop an open ethical discourse between those Anatomical Programs that use the bodies of the executed and those who do not.

Anatomical Programs that have chosen to use the bodies of voluntary donors exclusively have done so based on considerations of individual human rights and dignity, including informed consent (e.g., Jones, 2000). Given the history and ethical controversies, modern Departments of Anatomy with body donation programs should forego the use of the bodies of the executed in the future.

REFERENCES

- Ackerman MJ, Spitzer VM, Scherzinger AL, Whitlock DG. 1995. The visible human data set: An image resource for anatomical visualization. *Medinfo* 8:1195–1198.
- Aly G. 1987. Das Posener Tagebuch des Anatomen Hermann Voss. In: Biedermann Schreibtischtäter, editor. *Materialien zur deutschen Täter-Biographie*. Berlin: Rotbuch Verlag. p 15–66.
- Aly G. 1994. The Posen diaries of the anatomist Hermann Voss. In: Aly G, Chroust P, Pross C, editors. *Cleansing the Fatherland. Nazi Medicine and Racial Hygiene*. Baltimore: The Johns Hopkins University Press. p 99–155.
- Aly G. 2003. Ein Arbeitsunfall. Rassenkunde, Nebenerwerb und Versicherungsrecht. In: Aly G, Rasse, Klasse, editors. *Nachforschungen zum deutschen Wesen*. Frankfurt am Main: S. Fischer Verlag. p 145–154.

- AMA. 2005. American Medical Association E-2.06 Capital punishment. URL: <http://www.ama-assn.org/ama/pub/category/8419.html> [Accessed March 2007].
- Amnesty International. 2005. Report 2005 China. URL: <http://web.amnesty.org/report2005/chn-summary-eng> [Accessed October 2006].
- Amnesty International. 2006. The death penalty. URL: <http://web.amnesty.org/pages/deathpenalty-index-eng> [Accessed November 2006].
- Angetter DC. 1998. Erfassung der von der NS-Justiz in Wien in der Zeit von 1938–1945 Hingerichteten, die als Studienleichen dem anatomischen Institut der Universität Wien zugewiesen wurden. In: Akademischer Senat der Universität Wien, editor. Senatsprojekt der Universität Wien: Untersuchungen zur anatomischen Wissenschaft in Wien 1938–1945. p 81–92.
- Angetter DC. 1999. Die Wiener anatomische Schule. Wien Klin Wochenschr 111:764–774.
- Angetter DC. 2000. Anatomical science at University of Vienna 1938–45. Senate Project of the University of Vienna. Lancet 355:1454–1457.
- Aumüller G, Grundmann K. 2002. Anatomy during the Third Reich—The Institute of Anatomy at the University of Marburg, as an example. Ann Anat 184:295–303.
- Ball JM. 1928. The Body Snatchers: Doctors, Grave Robbers and the Law. Reprint 1989, New York: Dorset Press.
- Barboza D. 2006. China turns out mummified bodies for displays. New York Times, 8 August 2006. URL: <http://www.nytimes.com/2006/08/08/business/worldbusiness/08bodies.html?ei=5088&en=672da5787d998daf&ex=1312689600&partner=rssnyt&emc=rss&pagewanted=all> [Accessed Aug 2006].
- Barilan YM. 2005. The story of the body and the story of the person: Towards an ethics of representing human bodies and body-parts. Med Health Care Philos 8:193–205.
- Barilan YM. 2006. Bodyworlds and the ethics of using human remains: A preliminary discussion. Bioethics 20:233–247.
- Becker KW. 2002. Anmerkungen zur anatomischen Sektion. Text zum Katalog der Ausstellung: KunstOrt Anatomie- Künstler auf Visite. 23.Mai- 21. Juni 2002 im anatomischen Institut der Universität des Saarlandes. URL: scidok.sulb.uni-saarland.de/volltexte/2003/107/pdf/Zur_Geschichte_der_anatomischen_Sektion.pdf [Accessed March 2007].
- Blakely R, Harrington JM. (eds.) 1997. Bones in the Basement: Post-mortem Racism in Nineteenth-Century Medical Training. Washington and London: Smithsonian Institution Press.
- Boseley S. 2006. UK transplant patients go to China for organs from executed prisoners. The Guardian, 20 April 2006. URL: <http://www.guardian.co.uk/medicine/story/0,,1757219,00.html> [Accessed October 2006].
- Bundesärztekammer. 2003. Arbeitskreis "Menschliche Präparate Sammlungen": Empfehlungen zum Umgang mit Präparaten aus menschlichem Gewebe in Sammlungen, Museen und öffentlichen Räumen. Deutsch Ärztebl 8:378–383. English translation available under URL: www.aemhsm.net/.../Recommendations%20on%20the%20treatment%20of%20human%20remains%20in%20collections.pdf [Accessed March 2007].
- Canadian Legal Information Institute: The Anatomy Act, C.C.S.M.v.A80. URL: <http://www.canlii.org/mb/laws/sta/a-80/20060515/whole.html> [Accessed July 2006].
- Davidson M. 1995. Body trouble. New Phys 44:30–35.
- DCMS. 2005. Guidance for the Care of Human Remains in Museums. Department for Culture, Media and Sport, Great Britain. URL: www.culture.gov.uk/NR/rdonlyres/0017476B-3B86-46F3-BAB3-11E5A5F7F0A1/0/GuidanceHumanRemains11Oct.pdf [Accessed March 2007].
- Dowling CG, Tsiaras A. 1997. The Visible Man: The execution and electronic afterlife of Joseph Paul Jernigan. Life 20:40. URL: <http://www.life.com/Life/science/body/body01.html> [Accessed March 2007].
- DPIC. 2006. Death penalty information center: History of the death penalty. URL: <http://www.deathpenaltyinfo.org/article.php?did=199&scid=15> and FactSheet.pdf [Accessed August 2006].
- Drews U. 1992. Die Zeit des Nationalsozialismus am Anatomischen Institut in Tübingen, Unbeantwortete ethische Fragen damals und heute. In: Peiffer J, editor. Menschenverachtung und Opportunismus: Zur Medizin im Dritten Reich. Tübingen: Attempto. p 93–107.
- Duffin J. 1999. History of Medicine. A Scandalously Short Introduction. Toronto: University of Toronto Press. p 34.
- Dyer GS, Thorndike ME. 2000. Quidne mortui vivos docent? The evolving purpose of human dissection in medical education. Acad Med 75:969–979.
- Enke U. 2005. "... fuer uns das feinste Parfüm" Historische Anmerkungen zu Anatomie und anatomischem Unterricht an den hessischen Universitäten vom 16. bis zum 18. Jahrhundert. Hess Ärztebl 12:819–824.
- Ferner H. 1940. Untersuchungen ueber die "zelligen Knötchen" ("Epithelgranulationen") und die Kalkkugeln in den Hirnhäuten des Menschen. Z. mikr.-anat. Forschung 48:592–600.
- Gere C. 2005. A brief history of brain archiving. URL: http://www.ibro.info/Pub_Main_Display.asp?Main_ID=505 [Accessed September 2006].
- Gerhardt P, Frommhold W. 1988. Atlas of Anatomic Correlations in CT and MRI. Stuttgart: Thieme.
- Goddard S. 2003. A history of gross anatomy-lessons for the future. Univ of Toronto Med J 80:145–147.
- Gopichand PV. 2002. Editorial. J Anat Soc India 51:143–144.
- Graham K, Duryea B. 2005. Who is running man? St. Petersburg Times, July 28, 2005, URL: http://www.sptimes.com/2005/07/28/Tampabay/Who_is_running_man.shtml [Accessed November 2006].
- Grundmann K, Aumüller G. 1996. Anatomen in der NS-Zeit—Parteigenossen oder Karteigenossen? Das Marburger Anatomische Institut im Dritten Reich. Medizinhist J 31:322–357.
- Guoqi W. 2002. Habeas Corpus (Testimony by Wang Guoqi given in June 2001). Harper's Magazine, February 2002. URL: <http://www.harper.org/HabeasCorpus.html> [Accessed October 2006].
- Halperin EC. 2007. The poor, the Black, and the marginalized as the source of cadavers in United States anatomical education. Clin Anat 20:489–495.
- Heiss R. 1952. Lebensbild: Hermann Stieve zum Gedächtnis. Med Klin (Munich) 47:1729–1730.
- Hildebrandt S. 2006. How the Pernkopf controversy facilitated a historical and ethical analysis of the anatomical sciences in Austria and Germany: A recommendation for the continued use of the Pernkopf atlas. Clin Anat 19:91–100.
- Hopper L. 2002. His dying wish: body of executed inmate was milled, then rendered into 1,800 photos used for medical training. Houston Chronicle 17 June 2002. URL: http://www.chron.com/CDA/archives/archive.mpl?id=2002_3555156 [Accessed September 2006].
- Hours C. 2005. Iron stomach needed for exhibition of Chinese bodies. Mail and Guardian online 23 November 2005. URL: http://www.mg.co.za/articlePage.aspx?articleid=257338&area=/breaking_news/breaking_news__international_news/ [Accessed October 2006].
- Hunter RH. 1931. A Short History of Anatomy. London: John Bale, Sons and Danielsson Ltd.
- Jacobs A. 2005. Cadaver exhibition raises questions beyond taste. The New York Times 18 November 2005. URL: <http://www.nytimes.com/2005/11/18/nyregion/18bodies.html?pagewanted=2&ei=5088&en=f721f29c6f3864b1&ex=1289970000&partner=rssnyt&emc=rss> [Accessed November 2006].
- Jones DG. 2000. Speaking for the Dead: Cadavers in Biology and Medicine. Aldershot: Ashgate Dartmouth.
- Jones DG. 2006. Personal communication.
- Jones DG, Fennell S. 1991. Bequests, cadavers and dissections: Sketches from New Zealand history. N Z Med J 104:210–212.
- Klee E. 1985. Dokumente zur Euthanasie. Frankfurt am Main: Fischer.
- Klee E. 2001. Deutsche Medizin im Dritten Reich. Karrieren vor und nach 1945. Frankfurt am Main: S. Fischer. p 138–139.
- Klee E. 2003. Das Personenlexikon zum Dritten Reich. Wer war vor und nach 1945? Frankfurt am Main: S. Fischer.

- Lachman E. 1977. Anatomist of infamy: August Hirt. *Bull Hist Med* 51:594–602.
- Landgericht Münster. 1960. Das Urteil gegen Dr. Johann Paul Kremer. In: *Justiz und NS-Verbrechen*. Band XVII. URL: <http://www1.jur.uva.nl/junsv/Excerpts/Kremer.htm> [Accessed September 2006].
- Lifton RJ. 1986. *Ärzte im Dritten Reich*. German Edition 1998. Berlin: Ullstein Buchverlag GmbH & Co KG. p 33 ff.
- MacDonald H. 2006. *Human Remains: Dissection and its Histories*. New Haven and London: Yale University Press.
- Malina P, Spann G. 1999. Das Senatsprojekt der Universität Wien "Untersuchungen zur Anatomischen Wissenschaft in Wien 1938–1945". *Wien Klin Wochenschr* 111:734–753.
- Messerschmidt FW, Wüllner F. 1987. Die Wehrmachtsjustiz im Dienste des Nationalsozialismus. Zerstörung einer Legende. Baden-Baden: Nomos-Verlagsgesellschaft.
- Mitscherlich A, Mielke F. 1960. *Medizin ohne Menschlichkeit*. Dokumente des Nürnberger Ärzteprozesses. First published in 1948 as: *Wissenschaft ohne Menschlichkeit*. Frankfurt am Main: Fischer Taschenbuch Verlag. p 225–235.
- Mohseni Y. 2006. Body snatchers: The exhibit is riveting, but critics wonder where these cadavers came from. *Discover* 27:4 p 10. URL: <http://www.discover.com/issues/apr-06/cover/> [Accessed October 2006].
- Mörke KD. 1988. *Geschichte der Tübinger Anatomie*. Conturbinum: Beiträge zur Geschichte der Eberhard-Karls-Universität Tübingen. Band 35. Tübingen: JCB Mohr (Paul Siebeck).
- Mühlberger K. 1998. Die Belieferung des anatomischen Institutes der Universität Wien mit Studienleichen in der Zeit von 1938–1946. In: *Akademischer Senat der Universität Wien (ed.) Senatprojekt der Universität Wien: Untersuchungen zur anatomischen Wissenschaft in Wien 1938–1945*. p 29–66.
- Nemec J. 1968. Highlights in medicolegal relations. *National Library of Medicine*. URL: <http://www.nlm.nih.gov/hmd/pdf/highlights.pdf> [Accessed October 2006].
- NLM NIH. 2007. *National Library of Medicine's Visible Human Project*. URL: http://www.nlm.nih.gov/research/visible/visible_human.html [Accessed March 2007]
- Nnodim JO. 1996. Preclinical student reactions to dissection, death, and dying. *Clin Anat* 9:175–182.
- Our Body. 2006. *Our Body: The Universe Within*. URL: <http://www.ourbodytheuniversewithin.com/> [Accessed March 2007].
- Park K. 2006. *Secrets of Women: Gender, Generation, and the Origins of Human Dissection*. New York: Zone Books. p 15.
- Park JS, Chung MS, Hwang SB, Shin BS, Park HS. 2006. Visible Korean Human: Its techniques and applications. *Clin Anat* 19:216–224.
- Parmly ME. 2001. Sale of human organs in China. Hearing before the Subcommittee on International Operations and Human Rights, House of International Relations Washington DC. US Department of State. URL: <http://www.state.gov/g/drl/rls/rm/2001/3792.htm> [Accessed October 2006].
- Pauser P. 1998. Sektion als Strafe. In: *Körper ohne Leben*, editor. *Begegnung und Umgang mit Toten*. Wien: Böhlau. p 527–535.
- Persaud TV. 1984. *Early History of Human Anatomy*. Springfield: Charles C Thomas. p 82.
- Persaud TV. 1997. *A History of Human Anatomy: The Post-Vesalian Era*. Springfield: Charles C Thomas. p 298, 309.
- Peuker T, Schulz C. 2004. *Der über Leichen geht*. Berlin: Ch. Links Verlag.
- Premier Exhibitions. 2006. *Bodies: The exhibition*. URL: <http://www.bodiethexhibition.com/bodies.html> [Accessed March 2007].
- Redies C, Viebig M, Zimmermann S, Fröber R. 2005. Origin of corpses received by the anatomical institute at the University of Jena during the Nazi regime. *Anat Rec B New Anat* 285:6–10.
- Richardson R. 1987. *Death, Dissection and the Destitute (2nd Ed.)*, with a new afterword (2000). Chicago and London: The University of Chicago Press.
- Röbel S, Wassermann A. 2004. *Händler des Todes*. *Der Spiegel* 19:36–50.
- Sappol M. 2002. *A traffic of dead bodies: Anatomy and embodied social identity in nineteenth-century America*. Princeton, Oxford: Princeton University Press.
- Schabas WA. 1993. *The abolition of the death penalty in international law*. Cambridge: Grotius Publication Limited.
- Schagen U. 2005. Die Forschung an menschlichen Organen nach "plötzlichem Tod" und der Anatom Hermann Stieve (1886–1952). In: vom Bruch R, Schaarschmidt R, editors. *Die Berliner Universität in der NS-Zeit*. Band II: Fachbereiche und Fakultäten. Stuttgart: Franz Steiner Verlag Wiesbaden GmbH. p 35–54.
- Schmugge L. 1989. Leichen fuer Heidelberg und Tübingen. In: *Staat, Kirche, Wissenschaft in einer pluralistischen Gesellschaft; Festschrift zum 65. Geburtstag von Paul Mikat*. Berlin: Duncker & Humblot. p 411–418.
- Schönhagen B. 1992. Das Gräberfeld X auf dem Tuebinger Stadtfriedhof. Die verdrängte "Normalität" nationalsozialistischer Vernichtungspolitik. In: Peiffer J, editor. *Menschenverachtung und Opportunismus. Zur Medizin im Dritten Reich*. Tübingen: Attempto. p 68–92.
- Schuhmacher GH, Wischhusen H. 1970. *Anatomia Rostochiensis: Die Geschichte der Anatomie an der 550 Jahre alten Universität Rostock*. Berlin: Akademie-Verlag.
- Seidelman WE. 1999. *Medicine and murder in the Third Reich*. *Dimensions* 13(1). URL: http://www.adl.org/Braun/dim_13_1_med_murder.asp [Accessed July 2006].
- Singer C. 1957. *A short history of anatomy from the Greeks to Harvey*. New York: Dover.
- Spitz V. 2005. *Doctors from hell. The horrific account of Nazi Experiments on Humans*. Boulder Colorado: Sentient Publications. p 231–233.
- Spitzer VM, Scherzinger AL. 2006. Virtual anatomy: An anatomist's playground. *Clin Anat* 19:192–203.
- Spitzer VM, Whitlock DG. 1998. The Visible Human Dataset: The anatomical platform for human simulation. *Anat Rec* 253:49–57.
- Spitzer VM, Ackerman MJ, Scherzinger AL, Whitlock D. 1996. The Visible Human Male: A technical report. *J Am Med Inform Assoc* 3:118–130.
- Stern M. 2003. Shiny, happy people: 'Body Worlds' and the commodification of health. *Radical Philos* March/April 2003. URL: http://www.radicalphilosophy.com/default.asp?channel_id=2187&editorial_id=11213 [Accessed February 2006].
- Stieve H. 1952. *Der Einfluss des Nervensystems auf Bau und Tätigkeit der Geschlechtsorgane des Menschen*. Stuttgart: Thieme.
- Stukenbrock K. 2001. *Der zerstückte Coerper: Zur Sozialgeschichte der anatomischen Sektionen in der frühen Neuzeit (1650–1800)*. Stuttgart: Franz Steiner Verlag.
- Stukenbrock K. 2003. Unter dem Primat der Ökonomie? Soziale und wirtschaftliche Randbedingungen der Leichenbeschaffung fuer die Anatomie. In: Helm J, Stukenbrock K, editors. *Anatomie: Sektionen einer medizinischen Wissenschaft im 18. Jahrhundert*. Stuttgart: Franz Steiner Verlag. p 227–239.
- Sussmann E. 1940. Über das Verhalten von Gitterfasern im Hodenzwischengewebe des Menschen in verschiedenen Lebensaltern. *Z mikr anat Forschung* 48:450–460.
- Ulaby N. 2006. *Origins of exhibited cadavers questioned*. NPR, 10/11 August 2006. URL: <http://www.npr.org/templates/story/story.php?storyId=5637687> [Accessed September 2006].
- Uniform Anatomical Gift Act 1987. URL: <http://www.law.upenn.edu/bl/ulc/fnact99/uaga87.htm> [Accessed March 2007].
- Viebig M. 2002. Zu Problemen der Leichenversorgung des Anatomischen Institutes der Universität Halle vom 19. bis Mitte des 20. Jahrhunderts. In: *Beiträge zur Geschichte der Martin-Luther-Universität 1502–2002*. Halle: Mitteldeutscher Verlag. p 117–146.
- von Hagens G. 2003. Gunther von Hagens' statement about the ARD program "Dances with corpses" on 12 March 2003, 11.30 pm. URL: www.bodyworlds.com/Downloads/stellungnahme_ard_en.pdf [Accessed October 2006].
- von Staden H. 1989. *Herophilus: The Art of Medicine in Early Alexandria*. Cambridge: Cambridge University Press.
- Wade RC. 2007. Personal communication.
- Wagner W. 1974. *Der Volksgerichtshof im nationalsozialistischen Staat*. In: *Quellen und Darstellungen zur Zeitgeschichte*, editor. Band 16/III: *Die Deutsche Justiz im Nationalsozialismus*. Stuttgart: Deutsche Verlagsanstalt.

- Walia MS. 2003. Unclaimed bodies. The Tribune online edition 07/10/2003. URL: <http://www.tribuneindia.com/2003/20030710/mailbag.htm> [Accessed March 2007].
- Weingarten A. 2005. Florida museumgoers line up to see corpses. New York Times Regional Newspapers, 20 August 2005. URL: <http://travel2.nytimes.com/2005/08/20/arts/design/20bodi.html?ex=1162530000&en=ec40537a87a5d3b6&ei=5070> [Accessed November 2006].
- Weissmann G. 1985. Springtime for Pernkopf. *Hosp Pract (Office Edition)* 20:142–168. Reprinted in: Weissmann G. 1987. They all laughed at Christopher Columbus. New York: Times Books. p 48–69.
- Wetzel R. 1940. Theorie und Wissenschaft im ärztlichen Beruf. *Deutschlands Erneuerung* 24:12–17.
- Williams DJ. 1988. The history of Eduard Pernkopf's *Topographische Anatomie des Menschen*. *J Biocommun* 15:2–12.
- WMA. 2003. World Medical Association Resolution on Physician Participation in Capital Punishment. URL: <http://www.wma.net/e/policy/c1.htm> [Accessed March 2007].
- Wolf-Heidegger G, Cetto AM. 1967. *Die anatomische Sektion in bildlicher Darstellung*. Basel, New York: Karger. p 74.
- Working R. 2005. Shock value: Gunther von Hagens has outraged critics with macabre publicity stunts to promote "Body Worlds" and lure 17 million visitors to the exhibits worldwide. It's all in the service of science, he says. *Chicago Tribune* July 31, 2005. URL: <http://www.chicagotribune.com/features/lifestyle/health/chi-0507310429jul31,1,3790747.story?coll=chi-health-utl> [Accessed November 2006].
- Wu HH. 1992. *Laogai—The Chinese Gulag*. Boulder: Westview Press. p IX/X.
- Wu HH. 1996. Troublemaker: One man's crusade against China's cruelty. In: Wu H, Vecsey G, editors. New York: Times Books. p 148–156, 169–182, 187–188.
- Wu HH. 1998. Using organs from executed prisoners is unethical. In: Roleff TL, editor. *Biomedical Ethics: Opposing Viewpoints*. San Diego: Greenhaven Press. p 103–107.
- Zhang SX, Heng PA, Liu ZJ, Tan LW, Qiu MG, Li QY, Liao RX, Li K, Cui GY, Guo YL, Yang XP, Liu GJ, Shan JL, Liu JJ, Zhang WG, Chen XH, Chen JH, Wang J, Chen W, Lu M, You J, Pang XL, Xiao H, Xie YM. 2003. Creation of the Chinese Visible Human Data set. *Anat Rec B New Anat* 275:190–195.